



Our 9th month! Electrical code issues and answers.

● Plan review within city inspection jurisdictions.

WAC 296-46-140 (1) was revised effective June 30, 1998. The changes make it clear that *"Plan review is part of the electrical inspection process,"* and that plans for electrical installations within the jurisdiction of cities performing electrical inspections *"shall be submitted to that city for review rather than to the department."* It is appropriate that cities choosing to do electrical inspections assume **all** of the responsibility for their inspections, including the required plan review for proper code-compliant equipment capacity and rating in healthcare, institutional, and educational occupancies. **It should be noted that Superintendent of Public Instruction (SPI) rules require Labor and Industries plan review and approval when SPI funding is involved in educational construction projects.** Except for SPI projects, the department has been returning plan review submittals to the submitter when the projects are within the inspection jurisdiction of cities. For additional plan review information, see our internet home page for the Electrical Plan Review Submittal Guide.

● Bonding of metal raceways on over 250 volt systems.

For any circuits of over 250 volts to ground, NEC Article 250-76 requires that the electrical continuity of metal raceways and metal sheathed cable be ensured by "service-type" bonding methods from NEC 250-72(b) through (e). This requires the use of threaded hubs, bonding bushings with bonding jumpers, bonding-type locknuts, and other approved devices. By exception, if metal enclosures do not have concentric, eccentric, or oversized knockouts; or if the eccentric or concentric knockouts have been tested and listed for the use; then regular double locknuts, fittings with shoulders that seat firmly against the enclosure secured with single locknuts, and other listed fittings are permitted to bond the raceways. On both ends of connecting raceway or cable sections in over 250 volt systems, this additional attention to bonding is extremely important where the metal raceway or cable sheath serves as the circuit equipment grounding conductor.

If an equipment grounding conductor is installed inside the raceway or cable along with the circuit conductors, and metal boxes and enclosures are connected to the equipment grounding conductors per NEC 250-114(a), then the over 250 volt raceway bonding requirements do not need to be as strictly applied. Sufficient protection from arcing-faults and an adequate low impedance ground fault path can be accomplished by ensuring that connecting metal raceways or cable sheaths have bonding on one end meeting the requirements of NEC 250-76 or its exception. Normal raceway or cable connections may be used on the other end.

● Laundry receptacle requirements with stackable laundry equipment.

If a 30-amp, 240/120 volt circuit (and receptacle) is installed for a stackable washer/dryer; is a 20-amp, 120 volt laundry branch circuit (and receptacle) still required? The answer is yes.

A proposal (#2-294) was made to change the language in (1999) NEC 220-4(c) so that it required at least one additional "branch circuit no less than 20 ampere" shall be provided to supply the laundry receptacle outlet(s). The substantiation was: "There is a conflict in situations where a stackable washer/dryer requires more than a 20 ampere circuit. This could require a circuit for the stackable washer/dryer as well as the required 20A circuit."

During the comments stage of the code cycle, an additional recommendation (#2-125) was made to address this situation as follows: "In dwelling units of multifamily buildings with limited laundry space designed for stackable washer and dryer facilities only, a laundry receptacle shall not be required other than the receptacle for the laundry equipment." Part of the substantiation presented was that with limited building space laundry areas "are being designed to accommodate only the stackable type washer and dryer, with room for nothing else."

Code Panel No. 2 rejected both proposals with the following statement: *"A 20 ampere circuit is required for the laundry receptacle outlets. An additional circuit would be required for a specific appliance."* (Such as stackable washer/dryers or electric clothes dryers). The intention of the code panel is clear. For additional information on laundry area receptacles, refer to the previous discussion of this topic in the March 1998 edition of ELECTRICAL CURRENTS (available on our Internet home page).

● Use of flexible cords for supplying gas furnaces and other circuit requirements.

A gas furnace is not a portable appliance, not stationary equipment requiring frequent interchange, the fastening means and mechanical connections are not specifically designed to permit ready removal for maintenance and repair, and it is not identified for flexible cord connection. NEC 400-8 states *"flexible cords and cables shall not be used as a substitute for the fixed wiring of a structure."* Although some installers attempt to use this as a quick, inexpensive method to make a power connection, flexible cords can not be used as the wiring method for a gas furnace circuit.

Additional requirements for a gas furnace circuit can be found in NEC 422-7. A gas furnace is central heating equipment other than fixed electric space-heating equipment and it *"shall be supplied by an individual branch circuit."* An exception allows auxiliary equipment directly associated with the heating equipment, such as pumps, valves, electrostatic air cleaners, and humidifiers, to be connected to the same branch circuit. Transfer equipment used to supply gas furnace branch circuits on loss of normal electrical power must be approved for the intended use per NEC 702-4 & 6 for Optional Standby Systems and NEC 701-4 & 7 for Legally Required Standby Systems.

● Information required on electrical work permit applications.

In order for the department to provide better service to its customers it is essential that the Electrical Work Permit Application Form (F500-001-000) is completely and legibly filled out. To avoid unnecessary delays in the inspection process please pay particular attention to the following when completing the form:

1. Complete **all** appropriate blanks. This includes the space on the application where a map is to be drawn. Vacations, illness or injury, and heavy development in a specific area can leave an inspection office temporarily under-staffed.. Inspectors often are asked to assist in doing inspections in areas that may be unfamiliar to them, and a map is essential to helping them quickly find a job site so that a timely inspection can be done. Many areas have such rapid growth that some new streets are not shown in commercially available map books. A new address on a new street can be impossible to find without a reference (map) to streets that do appear in commercial maps.
2. Provide a **detailed** description of the work being done. For example: "One new 20 amp/120 volt circuit to copy machine in managers office from service panel," instead of "1-5 circuits". It is important that the inspector knows the complete scope of the work performed and all the areas within a facility where work was done.
3. The person signing the permit application must be authorized to do so. These **"authorized"** individuals must have their signatures on file at the service location at which the applications are processed.

Additional details on electrical work permits and requirements for posting permits on job sites can be found in WAC 296-46-495.

● Grounding electrode conductor connections must be accessible.

Article 250-23 (a) of the National Electrical Code requires *"A premises wiring system that is supplied by an ac service that is grounded shall have at each service a grounding electrode conductor connected to a grounding electrode that complies with Part H of Article 250."*

It is also required that *"The grounding electrode conductor shall be connected to the grounded service conductor (neutral) at any **accessible** point from the load end of the service drop or service lateral to and including the terminal or bus to which the grounded service conductor is connected at the service disconnecting means."*

As it relates to the grounding electrode conductor connection to the grounded service conductor, the term "accessible" does not include a connection in any equipment that is sealed or locked by the serving utility, since these seals and/or locks are intended to restrict access. **Therefore a grounding electrode conductor termination in a CT enclosure, meter base, bus gutter, or other utility sealed enclosure is not accessible and in violation of NEC 250-23(a).**

Practices of serving utilities vary widely around the state. If you are working in the service area of a utility that you are not familiar with, check with them about their policies of sealing service enclosures before you terminate the grounding electrode conductors.

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